Horn

Special Tool(s)

 ST1137-A	73III Automotive Meter 105-R0057 or equivalent
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
 ST2574-A	Flex Probe Kit 105-R025C or equivalent

Principles of Operation

NOTE: The Smart Junction Box (SJB) is also known as the Generic Electronic Module (GEM).

The horn switch is incorporated within the steering wheel. When the switch is closed, ground is supplied through the clockspring from the vehicle harness. The horn relay is then energized, supplying voltage to the horn enabling the horn to sound. The horn relay is located in the Bussed Electrical Center (BEC).

Inspection and Verification

1. Verify the customer concern.

2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
• Horn • Horn switch (part of the steering wheel) • Clockspring	• Bussed Electrical Center (BEC) fuse 46 (25A) • Wiring, terminals or connectors • Horn relay • Horn switch (part of the steering wheel)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. **NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).

5. **NOTE:** The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

   If the scan tool does not communicate with the VCM:
   - Check the VCM connection to the vehicle.
   - Check the scan tool connection to the VCM.
   - Refer to Section 418-00, No Power To The Scan Tool, to diagnose no communication with the scan tool.

6. If the scan tool does not communicate with the vehicle:
   - Verify the ignition key is in the ON position.
   - Verify the scan tool operation with a known good vehicle.
   - Refer to Section 418-00 to diagnose no response from the PCM.

7. Carry out the network test.
   - If the scan tool responds with no communication with one or more modules, refer to Section 418-00.
   - If the network test passes, retrieve and record the continuous memory DTCs.

8. Clear the continuous DTCs and carry out the self-test diagnostics for the Smart Junction Box (SJB).

9. If the DTCs retrieved are related to the concern, go to DTC Charts. For all other DTCs, refer to the Diagnostic Trouble Code (DTC) Chart in Section 419-10.

10. If no DTCs related to the concern are retrieved, GO to Symptom Chart.

DTC Charts

Smart Junction Box (SJB) DTC Chart

DTC	Description	Action
B1217	Horn Relay Coil Circuit Failure	GO to Pinpoint Test A.
B1897	Horn Switch Circuit Failure	GO to Pinpoint Test B.
All other DTCs	—	REFER to the Diagnostic Trouble Code (DTC) Chart in Section 419-10.

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
• The horn is inoperative	• Fuse • Wiring, terminals or connectors • Horn relay • Horn switch (part of the steering wheel) • Horn • Clockspring • Bussed Electrical Center (BEC) • Smart Junction Box (SJB)	• GO to Pinpoint Test A.
• The horn is always on	• Wiring, terminals or connectors • Horn switch (part of the steering	• GO to Pinpoint Test B.

	wheel) • Clockspring • Horn relay • BEC • SJB	

Pinpoint Tests

Pinpoint Test A: The Horn Is Inoperative

Refer to Wiring Diagrams Cell 44 , Horn/Cigar Lighter for schematic and connector information.

Normal Operation

The horn relay control and switched voltage is supplied by the Bussed Electrical Center (BEC) through fuse 46 (25A). The SJB receives the horn signal through circuit 1 (DB) from the horn switch (part of the steering wheel). When the horn switch is pressed, ground is supplied through the clockspring to the vehicle harness through circuit 1205 (BK). The SJB then activates the horn relay through circuit 1323 (OG/RD). Voltage is then sent to the horn through circuit 6 (YE/LG), enabling the horns to sound. Ground is provided to the horn through circuit 1205 (BK).

- DTC B1217 (Horn Relay Coil Circuit Failure) — a continuous and on-demand DTC that sets when the SJB detects a short to voltage on circuit 1323 (OG/RD) or circuit 1 (DB).

This pinpoint test is intended to diagnose the following:

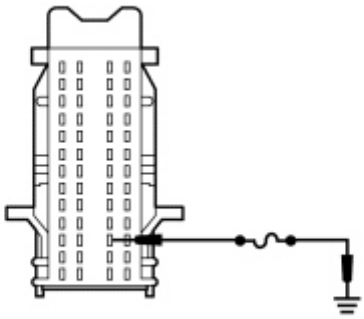
- Fuse
- Wiring, terminals or connectors
- Horn relay
- Horn switch (part of the steering wheel)
- Horn
- Clockspring
- BEC
- SJB

PINPOINT TEST A: THE HORN IS INOPERATIVE

NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

NOTE: Failure to disconnect the battery when instructed will result in false resistance readings. Refer to Section 414-01 .

Test Step	Result / Action to Take
A1 CHECK THE HORN CONTROL COMMAND	
• Ignition ON. • Enter the following diagnostic mode on the scan tool: SJB DataLogger. • Select the SJB horn PID (HORN), and command the horn on. • **Does the horn sound?**	**Yes** GO to A10 . **No** GO to A2 .
A2 CHECK THE SJB	
• Ignition OFF. • Disconnect: SJB C2280c. • Connect a fused jumper wire between the SJB C2280c-29, circuit 1323 (OG/RD), harness side and ground.	**Yes** REMOVE the jumper wire. GO to A14 .



N0085718

- **Does the horn sound?**

No
LEAVE the jumper wire connected. GO to A3 .

A3 CHECK THE HORN RELAY FOR CORRECT OPERATION

- Disconnect: Horn Relay .
- Install a known good relay.
- **Does the horn sound?**

Yes
REMOVE the known good relay and the jumper wire. INSTALL a new horn relay. TEST the system for normal operation.

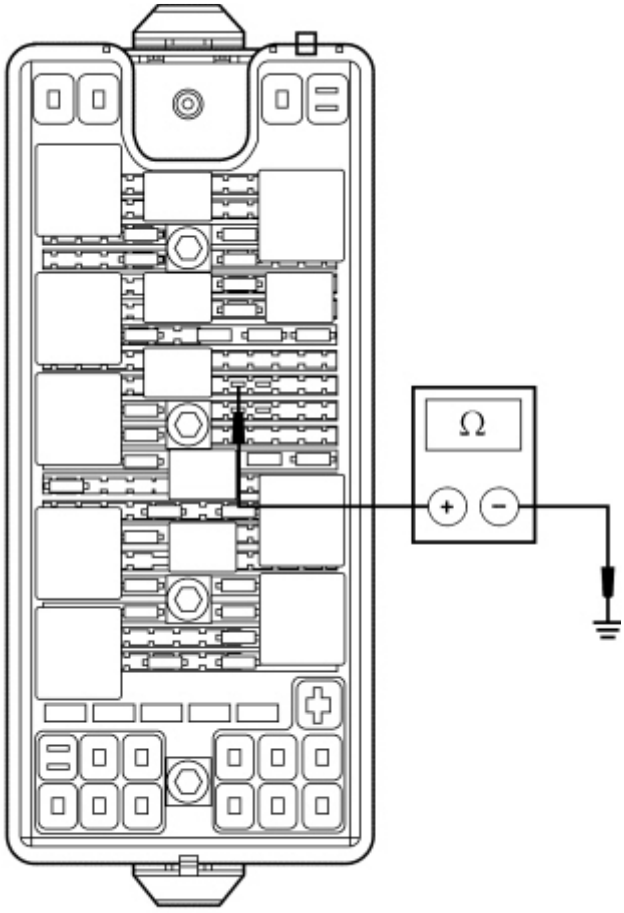
No
REMOVE the known good relay. GO to A4 .

A4 CHECK THE HORN RELAY CONTROL FOR AN OPEN

- Disconnect: Negative Battery Cable.
- Disconnect: Horn Relay.
- Measure the resistance between the horn relay pin 85, harness side and ground.

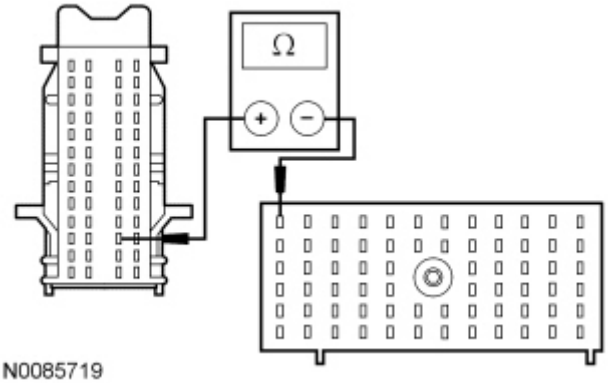
Yes
REMOVE the jumper wire. GO to A6 .

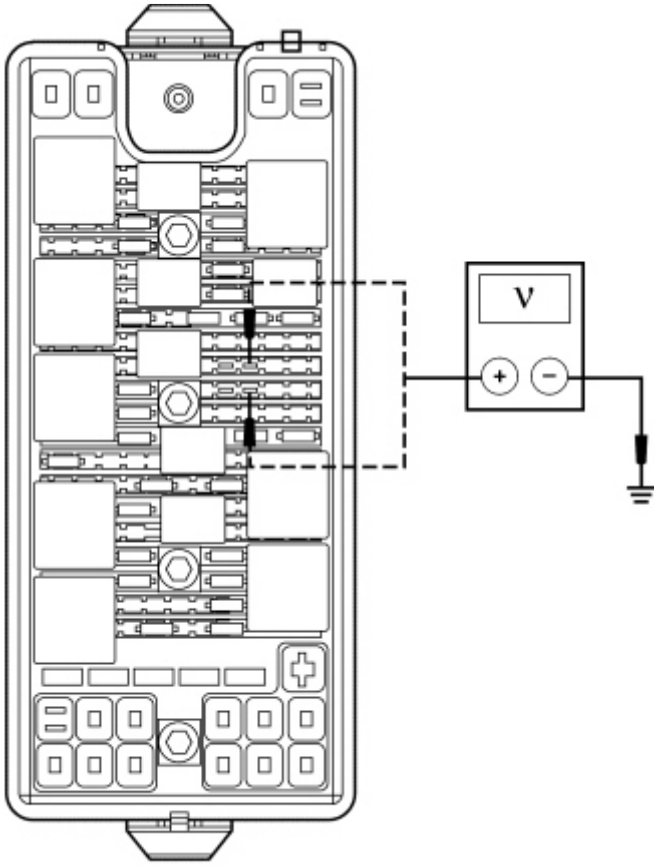
No
REMOVE the jumper wire. GO to A5 .



N0072729

- **Is the resistance less than 5 ohms?**

A5 CHECK CIRCUIT 1323 (OG/RD) FOR AN OPEN	
• Disconnect: BEC C1035a. • Measure the resistance between the SJB C2280c-29, circuit 1323 (OG/RD), harness side and the BEC C1035a-A1, circuit 1323 (OG/RD), harness side.  N0085719 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new BEC . TEST the system for normal operation. **No** REPAIR the circuit. TEST the system for normal operation.
A6 CHECK THE VOLTAGE SUPPLY TO THE HORN RELAY	
• Connect: Negative Battery Cable. • Ignition ON. • Measure the voltage between the horn relay pin 86, harness side and ground; and between the horn relay pin 87, harness side and ground.	**Yes** GO to A7 . **No** VERIFY the BEC fuse 46 (25A) is OK. If OK, INSTALL a new BEC . TEST the system for normal operation. If not OK, REFER to the



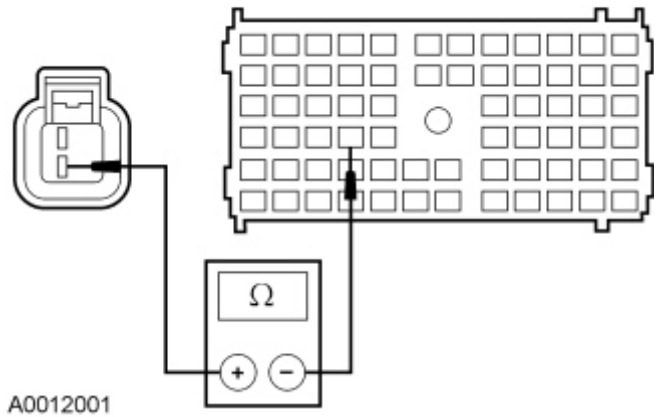
N0072732

- **Are the voltages greater than 10 volts?**

Wiring Diagram Manual to identify the possible causes of the circuit short.

A7 CHECK CIRCUIT 6 (YE/LG) FOR AN OPEN

- Ignition OFF.
- Disconnect: BEC C1035c.
- Disconnect: Horn C131.
- Measure the resistance between the horn C131-2, circuit 6 (YE/LG), harness side and the BEC C1035c-D4, circuit 6 (YE/LG), harness side.



A0012001

- **Is the resistance less than 5 ohms?**

Yes
GO to A8 .

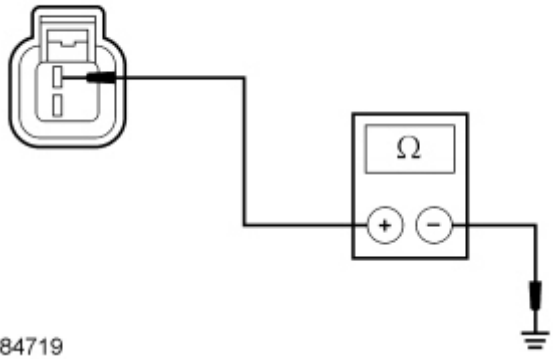
No
REPAIR the circuit. TEST the system for normal operation.

A8 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

- Disconnect: Negative Battery Cable.
- Measure the resistance between the horn C131-1, circuit 1205 (BK), harness side and ground.

Yes
GO to A9 .

No
REPAIR the circuit. TEST the system for normal operation.

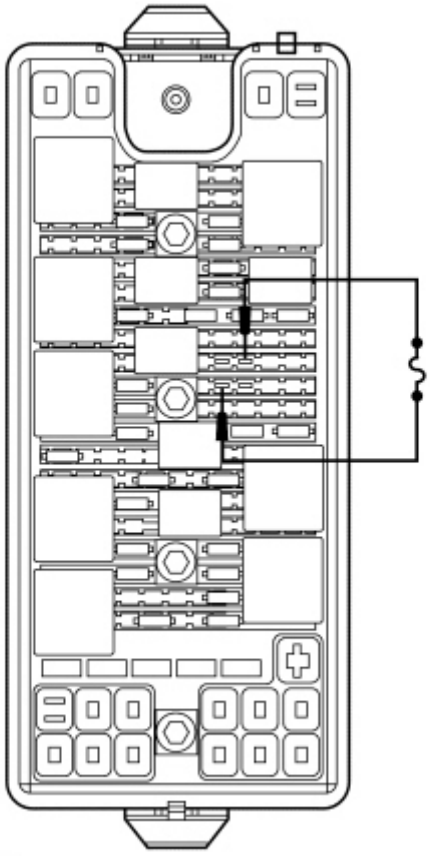


A0084719

- **Is the resistance less than 5 ohms?**

A9 CHECK THE BEC FOR AN INTERNAL OPEN

- Connect: Negative Battery Cable.
- Connect: BEC C1035c.
- Connect a fused jumper wire between the horn relay pin 30, harness side and the horn relay pin 87, harness side.

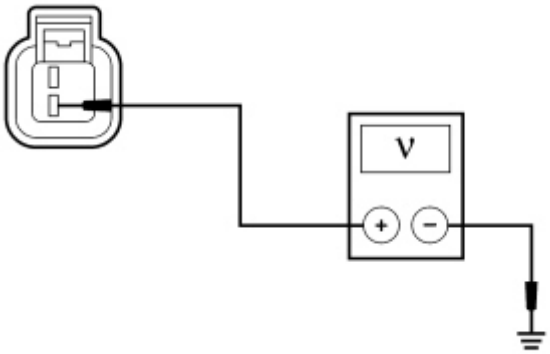


N0027054

- Measure the voltage between the horn C131-2, circuit 6 (YE/LG), harness side and ground.

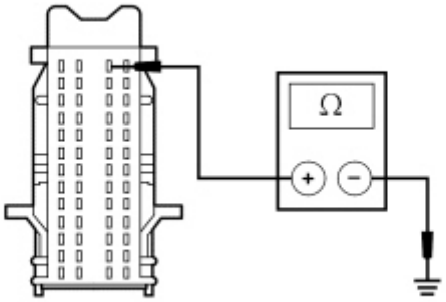
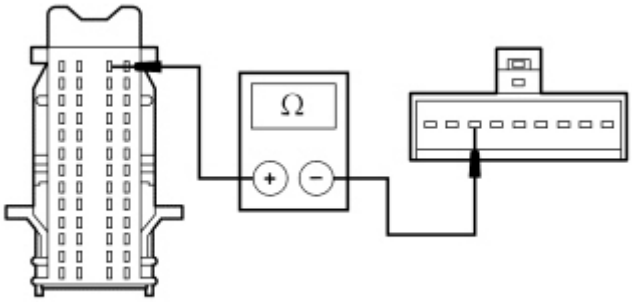
Yes
INSTALL a new horn. REFER to Horn in this section. TEST the system for normal operation.

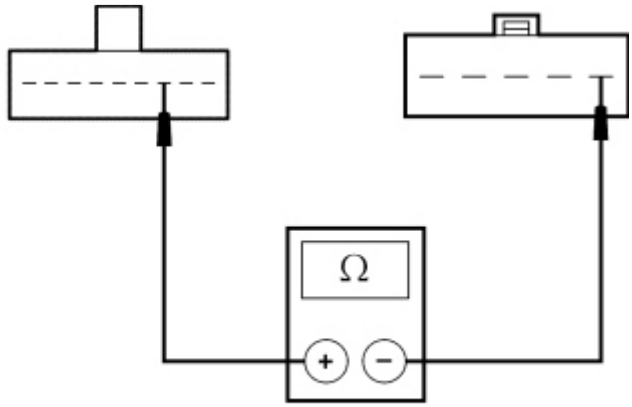
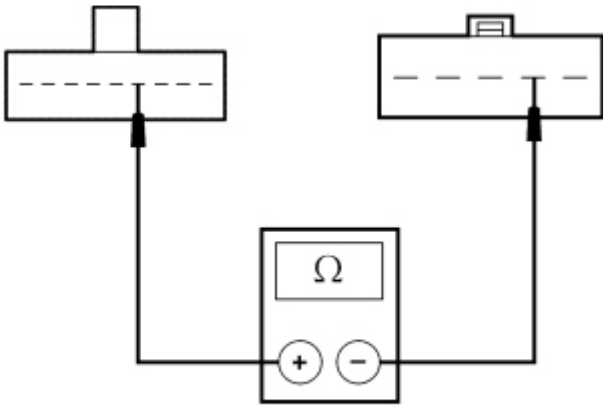
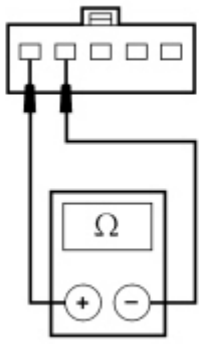
No
INSTALL a new BEC. TEST the system for normal operation.



N0012006

- **Is the voltage greater than 10 volts?**

A10 CHECK THE HORN SIGNAL TO THE SJB	
• Ignition OFF. • Disconnect: Negative Battery Cable. • Disconnect: SJB C2280b. • Measure the resistance between the SJB C2280b-39, circuit 1 (DB), harness side and ground, while pressing and releasing the horn switch.  N0072733 • **Is the resistance less than 5 ohms with the horn switch pressed, and greater than 10,000 ohms with the horn switch released?**	**Yes** GO to A14 . **No** GO to A11 .
A11 CHECK CIRCUIT 1 (DB) FOR AN OPEN	
• Depower the Supplemental Restraint System (SRS). Refer to Section 501-20B . • Disconnect: Clockspring C2274. • Measure the resistance between the SJB C2280b-39, circuit 1 (DB), harness side and the clockspring C2274-7, circuit 1 (DB), harness side.  N0072734 • **Is the resistance less than 5 ohms?**	**Yes** GO to A12 . **No** REPAIR the circuit. REPOWER the SRS . REFER to Section 501-20B . TEST the system for normal operation.
A12 CHECK THE CLOCKSPRING FOR AN OPEN	

• Remove the driver side air bag module. Refer to Section 501-20B . • Disconnect: Upper Clockspring Connector. • Measure the resistance between the clockspring C2274 pin 7, component side and the upper clockspring connector pin 5, component side.  N0072735 • Measure the resistance between the clockspring C2274 pin 6, component side and the upper clockspring connector pin 4, component side.  N0072736 • **Are the resistances less than 5 ohms?**	**Yes** GO to A13 . **No** INSTALL a new clockspring. REFER to Section 501-20B . TEST the system for normal operation.
A13 CHECK THE HORN SWITCH FOR CORRECT OPERATION	
• Measure the resistance between the upper clockspring connector pin 5, circuit 1 (BK), harness side and the upper clockspring connector pin 4, circuit 1205 (GN), harness side, while pressing and releasing the horn switch.  N0012003 • **Is the resistance less than 5 ohms with the horn switch pressed, and greater than 10,000 ohms with the horn switch released?**	**Yes** REPAIR circuit 1205 (BK) between the clockspring and ground. INSTALL the driver air bag module. REFER to Section 501-20B . TEST the system for normal operation. **No** INSTALL a new steering wheel. REFER to Section 211-04 . INSTALL the driver air bag module. REFER to Section 501-20B . TEST the system for normal operation.
A14 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB.
	REFER to Section 419-10.
	TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

Pinpoint Test B: The Horn Is Always On

Refer to Wiring Diagrams Cell 44, Horn/Cigar Lighter for schematic and connector information.

Normal Operation

The horn relay control and switched voltage is supplied by the Bussed Electrical Center (BEC) through fuse 46 (25A). The Smart Junction Box (SJB) receives the horn signal through circuit 1 (DB) from the horn switch (part of the steering wheel). When the horn switch is pressed, ground is supplied through the clockspring to the vehicle harness through circuit 1205 (BK). The SJB then activates the horn relay through circuit 1323 (OG/RD). Voltage is then sent to the horn through circuit 6 (YE/LG), enabling the horns to sound. Ground is provided to the horns through circuit 1205 (BK).

- DTC B1897 (Horn Switch Circuit Failure) — an on-demand DTC that sets when the SJB detects a short to ground on circuit 1323 (OG/RD) and circuit 1 (DB).

This pinpoint test is intended to diagnose the following:

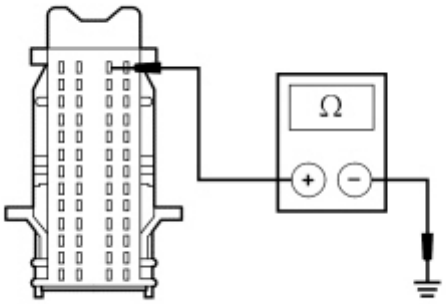
- Wiring, terminals or connectors
- Horn switch (part of the steering wheel)
- Clockspring
- Horn relay
- BEC
- SJB

PINPOINT TEST B: THE HORN IS ALWAYS ON

NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

NOTE: Failure to disconnect the battery when instructed will result in false resistance readings. Refer to Section 414-01.

Test Step	Result / Action to Take
B1 RETRIEVE THE SJB DTCs	
• Check the recorded results from the SJB on-demand self-test. • **Is DTC B1897 retrieved?**	**Yes** GO to B2. **No** GO to B8.
B2 CHECK FOR A SHORT TO GROUND INSIDE THE BEC	
• Ignition OFF. • Disconnect: BEC C1035a. • **Does the horn continue to sound?**	**Yes** INSTALL a new BEC. TEST the system for normal operation.

	No GO to B3 .
B3 CHECK CIRCUIT 1323 (OG/RD) FOR A SHORT TO GROUND • Disconnect: SJB C2280c. • Connect: BEC C1035a. • **Does the horn continue to sound?**	**Yes** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test. **No** GO to B4 .
B4 CHECK THE SJB • Connect: SJB C2280c. • Disconnect: SJB C2280b. • **Does the horn continue to sound?**	**Yes** GO to B10 . **No** GO to B5 .
B5 CHECK CIRCUIT 1 (DB) FOR A SHORT TO GROUND • Depower the Supplemental Restraint System (SRS). Refer to Section 501-20B . • Disconnect: Clockspring C2274. • Measure the resistance between the SJB C2280b-39, circuit 1 (DB), harness side and ground.  N0072733 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to B6 . **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
B6 CHECK THE CLOCKSPRING FOR A SHORT TO GROUND • Connect: Clockspring C2274. • Connect: SJB C2280b. • Remove the driver air bag module. Refer to Section 501-20B . • Disconnect: Upper Clockspring Connector. • Disconnect: Negative Battery Cable. • **Does the horn continue to sound?**	**Yes** INSTALL a new clockspring. REFER to Section 501-20B . CLEAR the DTCs. REPEAT the self-test. **No** GO to B7 .
B7 CHECK THE HORN SWITCH FOR A SHORT TO GROUND • Connect: Upper Clockspring Connector. • **Does the horn continue to sound?**	**Yes** REPAIR or INSTALL a new steering wheel harness. CLEAR the DTCs. REPEAT the self-test. **No** INSTALL a new steering wheel. REFER to Section 211-04 . INSTALL the driver air bag module. REFER to Section 501-20B . CLEAR the DTCs. REPEAT the self-test.
B8 CHECK THE HORN RELAY FOR CORRECT OPERATION • Disconnect: Horn Relay .	**Yes**

• Install a known good relay. • **Does the horn continue to sound?**	REMOVE the known good relay. INSTALL a new horn relay. TEST the system for normal operation. **No** REMOVE the known good relay. GO to B9 .
B9 CHECK CIRCUIT 6 (YE/LG) FOR A SHORT TO VOLTAGE	
• Disconnect: BEC C1035c. • **Does the horn continue to sound?**	**Yes** REPAIR the circuit. TEST the system for normal operation. **No** INSTALL a new BEC . TEST the system for normal operation.
B10 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB . REFER to Section 419-10 . TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.